

Eastern Maine Medical Center  
Penobscot County  
Bangor, Maine  
A-184-71-M-A (SM)

Departmental  
Findings of Fact and Order  
Air Emission License  
Amendment #1

After review of the air emission license amendment application, staff investigation reports, and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

**I. REGISTRATION**

A. Introduction

Eastern Maine Medical Center (EMMC) of Bangor, Maine renewed their Air Emission License on January 16, 2003, permitting the operation of emission sources associated with their hospital Emission Equipment.

EMMC has requested an amendment to construct and operate a new Cogeneration Plant. The Cogeneration Plant will contain a 4.6 MW (at ISO conditions) combustion turbine, an unfired heat recovery steam generator and a new 1.5 MW diesel-fired standby generator. Generator #4 is being removed from this license; it is only stored on site and will not be operated on EMMC's State Street campus.

B. Emission Equipment

**Fuel Burning Equipment Addition**

Equipment	Date of Construction	Maximum Capacity (MMBtu/hr)	Fuel Type, %Sulfur	Maximum Firing Rate	Stack #
<b>Cogen Plant</b>	2005/2006 (Planned)	64.4	Natural Gas	64,400 scf/hr	Cogen
		63.5	#2, 0.05%	454 gal/hr	

**Bold** indicates new equipment to license.

**Electrical Generation Equipment Changes**

Equipment	Engine Firing Rate (gal/hr)	Maximum Capacity (MMBtu/hr)	Stack #
Generator #1	35.6	4.88	2
Generator #2	107	14.6	3
Generator #3	107	14.6	4
Generator #4*	11	1.5	5
<b>Generator #5</b>	111	15.6	Gen

**Bold** indicates new equipment to license.

\*Generator #4 is not operated at EMMC's State Street campus. It is noted for completeness only

Formatted: Bullets and Numbering

Deleted: DRAFT 10/19/04

C. Application Classification

A new emission unit at a minor source is considered a major modification based on whether or not expected emission increases exceed the “Significant Emission Levels” as defined in the Department’s regulations. The emission increases associated with the new emission units are determined by the maximum future license allowed emissions, as follows:

<u>Pollutant</u>	<u>Max. Future License (TPY)</u>	<u>Sig. Level (TPY)</u>
PM	20.2	100
PM <sub>10</sub>	20.2	100
SO <sub>2</sub>	67.9	100
NO <sub>x</sub>	99.9	100
CO	56.8	100
VOC	13.3	50

Conclusion

The addition of the Cogen Plant and Generator #5 is a minor modification. All criteria pollutant emissions from new emission units are subject to Best Available Control Technology (BACT) requirements. With the annual heat input limit and hours of operation limits on the equipment, the facility is licensed below the major source thresholds and is considered a synthetic minor.

**II. BEST PRACTICAL TREATMENT**

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in Chapter 100 of the Department regulations. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in Chapter 100 of the Department’s regulations. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Cogeneration Plant

The Cogeneration Plant includes a Solar combustion turbine generator (CTG) and an unfired heat recovery steam generator (HRSG). The CTG will have an electric generating capacity of 4.6 MW (at ISO conditions) and will be capable of firing natural gas and #2 fuel oil. The dual-fuel design provides EMMC with an alternative fuel option in the event the natural gas supply is interrupted or becomes economically unfavorable due to market pricing.

Deleted: DRAFT ..DRAFT

The amount of #2 fuel oil licensed to be fired in the CTG without add-on NO<sub>x</sub> emission controls installed will be limited to keep campus-wide potential NO<sub>x</sub> emissions under the major source threshold of 100 tons per year. The technologies evaluated as part of BACT for the CTG were: Dry Low NO<sub>x</sub> Combustors (SoLoNO<sub>x</sub>), water injection, selective catalytic reduction, SCONO<sub>x</sub>, and an oxidation catalyst. Based on the supplied BACT analysis, BACT was determined to be:

- Clean fuels and good combustion practices to limit PM/PM<sub>10</sub> emissions to no greater than 0.042 lb/MMBtu while firing gas and 0.061 lb/MMBtu while firing oil.
- Natural gas and very low sulfur #2 fuel oil (0.05% sulfur by weight ) to achieve a maximum SO<sub>2</sub> emission rate of 0.18 pounds per hour while firing gas and 3.3 pounds per hour while firing oil.
- SoLoNO<sub>x</sub> Dry low NO<sub>x</sub> combustors to limit NO<sub>x</sub> emissions to 25 ppm on natural gas and 96 ppm on fuel oil (15% O<sub>2</sub>). Solar Turbines guarantees 15 ppm NO<sub>x</sub> on “gas only” combustors because the combustor design is different. Since only one fuel is involved, the combustion design can be maximized for gas fuel. Dual-fuel combustors must be larger in size to accommodate the necessary space for two fuel delivery systems, resulting in slightly higher NO<sub>x</sub> emission performance.
- SoLoNO<sub>x</sub> Dry low NO<sub>x</sub> combustors to limit CO emissions to less than 7.4 pounds per hour while firing gas and less than 7.5 pounds per hour while firing oil.
- State-of-the-art combustion controls to limit VOC emissions to less than 10 tons per year.
- When firing #2 fuel oil in the CTG, visible emissions shall not exceed 10 percent opacity on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period.
- When firing natural gas in the CTG, visible emissions shall not exceed 10 percent opacity on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period.

If EMMC operates the turbine on oil for more than the equivalent of 90 days per year, EMMC will retrofit the CTG/HRSG with Selective Catalytic Reduction (SCR) technology. The retrofit shall take place within twelve (12) months of the turbine operating on oil for more than the equivalent of 90 days per year.

C. Generator #5

The proposed generator will be a diesel-fired Caterpillar Model 3512BDITA having an electrical output capacity of 1.5 MW. Generator #5 is rated at 2,168 horsepower. BACT for Generator #5 is the following:

1. Annual hours of operation limited to 400 hours per year.

Deleted: DRAFT ..DRAFT

2. Chapter 106 regulates fuel sulfur content, however the use of 0.05% sulfur by weight fuel is BPT.
3. SO<sub>2</sub> emission data was based on fuel sulfur mass balance.
4. PM, PM<sub>10</sub>, NO<sub>x</sub>, CO and VOC emission limits are based on manufacturer "Not to exceed data".
5. For operational flexibility, NO<sub>x</sub> emissions from all generators combined shall not exceed 27.9 tons per year (based on a 12-month rolling total). The 400 hour per year limit for each generator will remain in effect as well.
6. Opacity from Generator #5 shall not exceed 20% on a six (6) minute block average basis, except for two (2) six (6) minute block averages in a 3-hour period.

D. Facility Emissions

EMMC is limited to the following fuel usage and has the following annual emissions, based on a 12 month rolling total:

- Combined #2 and natural gas fuel combustion equivalent to 210,000 MMBtu per year in the existing boilers.
- Up to 941,871 gallons per year of #2 fuel oil in the CTG (which is equivalent to 90 days per year of oil use) without SCR technology installed.
- 400 hours of operation per year for Generators #1, #2, #3, and #5 (each).
- The Turbine's Total Annual Emissions for all pollutants except NO<sub>x</sub> are based on year-round operation on #2 fuel oil with SCR installed, as this scenario results in the maximum potential emissions.
- The Turbine's Total Annual Emissions for NO<sub>x</sub> are based on the equivalent of 90 days of oil use, with the remaining turbine operating time on natural gas, as this scenario results in the maximum potential annual NO<sub>x</sub> emissions.

**Total Annual Emissions for the Facility based on Tons**  
(used to calculate the annual license fee)

	PM	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC
Boilers	2.52	2.52	52.88	26.25	15.76	2.68
Turbine	17.08	17.08	14.45	45.73 [25.60 (#2)] [20.13 (NG)]	32.85	9.64
Generator #1	0.12	0.12	0.05	27.9*	0.83	0.10
Generator #2	0.14	0.14	0.15		2.48	0.29
Generator #3	0.14	0.14	0.15		2.48	0.29
Generator #5	0.18	0.18	0.16		2.44	0.33
<b>Total TPY</b>	<b>20.2</b>	<b>20.2</b>	<b>67.9</b>	<b>99.9</b>	<b>56.8</b>	<b>13.3</b>

\*27.9 Tons per year of NO<sub>x</sub> from the generators combined. Compliance is based on #/hr limits for each generator and hours of operation of each generator.

Deleted: DRAFT .DRAFT

### **III. AMBIENT AIR QUALITY ANALYSIS**

#### **A. Overview**

A refined modeling analysis was performed to demonstrate that emissions from EMMC, in conjunction with other area sources, will not cause or contribute to violations of Maine Ambient Air Quality Standards (MAAQS) for SO<sub>2</sub>, PM<sub>10</sub>, NO<sub>2</sub> or CO.

Although it has been determined that EMMC's actual emission levels have decreased from the baseline year, given the significant differences in proposed stack height and flow characteristics, a Class II SO<sub>2</sub>, PM<sub>10</sub> and NO<sub>x</sub> increment analysis was required.

Since the current licensing action for EMMC represents a minor modification to a minor source and the nearest Class I area is approximately 52 kilometers away, MEDEP has determined that an assessment of Class I Air Quality Related Values (AQRVs) is not required.

#### **B. Model Inputs**

The ISC-PRIME model was used in refined simple terrain mode to address standards in all areas. In addition, the VALLEY screening mode of the COMPLEX-I model (CI-VM) was used to evaluate impacts in intermediate and complex terrain, i.e., areas where terrain elevations exceed the proposed stack-top elevations.

All modeling was performed in accordance with all applicable requirements of the Maine Department of Environmental Protection, Bureau of Air Quality (MEDEP-BAQ) and the United States Environmental Protection Agency (USEPA).

A valid 5-year hourly meteorological off-site database was used in the refined modeling. The wind data was collected at a height of 13.00 meters at the Bangor International airport DEP meteorological site during the 5-year period 1985-1989. Missing data were interpolated or coded as missing. Bangor FAA surface temperature data was used. Hourly cloud cover, ceiling height and surface wind speed also from the Bangor FAA were used to calculate stability. Hourly mixing heights were derived from Caribou NWS surface and upper air data.

Point-source parameters, used in the modeling for EMMC and other nearby sources, are listed in Table III-1. The ISC-PRIME modeling accounted for the potential of building wake effects on emissions from all modeled stacks that are below their respective formula GEP stack heights.

TABLE III-1 : Point Source Stack Parameters

Facility/Stack	Stack Base Elevation (m)	Stack Height (m)	GEP Stack Height (m)	Stack Diameter (m)	UTM Easting NAD83 (km)	UTM Northing NAD83 (km)
<b>CURRENT/PROPOSED</b>						
<b>Eastern Maine Medical Center</b>						
Co-Generation Plant Stack	19.20	28.96	43.89	1.52	519.902	4961.859
New Generator Stack	19.20	10.97	43.89	0.33	519.884	4961.828
Existing Boiler Stack	19.20	35.05	43.89	1.07	519.900	4961.839
Generator #2 Stack	19.20	10.97	43.89	0.33	519.887	4961.830
Generator #3 Stack	19.20	10.97	43.89	0.33	519.889	4961.831
<b>Acadia Hospital</b>						
Main Stack	41.80	13.72	42.67	0.48	518.703	4963.057
<b>Saint Joseph's Hospital</b>						
Main Stack	45.70	30.48	47.53	1.20	518.006	4962.305
<b>Bangor Mental Health Institute (BMHI)</b>						
Main Stack	44.50	25.90	54.86	1.83	520.419	4962.850
<b>1987 BASELINE</b>						
<b>Eastern Maine Medical Center</b>						
EMMC conservatively assumed no credit for EMMC sources existing in the 1987 baseline year						
<b>Acadia Hospital</b>						
EMMC conservatively assumed no credit for Acadia Hospital sources existing in the 1987 baseline year						
<b>Saint Joseph's Hospital</b>						
EMMC conservatively assumed no credit for Saint Joseph's Hospital sources existing in the 1987 baseline year						
<b>Bangor Mental Health Institute (BMHI)</b>						
EMMC conservatively assumed no credit for BMHI sources existing in the 1987 baseline year						
<b>1977 BASELINE</b>						
<b>Eastern Maine Medical Center</b>						
Cleaver-Brooks Boiler Stack	21.33	29.57	41.45	0.52	519.981	4961.810
Superior Boiler Stack	19.20	24.38	43.59	0.91	519.900	4961.839
<b>Acadia Hospital</b>						
EMMC conservatively assumed no credit for Acadia Hospital sources existing in the 1977 baseline year						
<b>Saint Joseph's Hospital</b>						
EMMC conservatively assumed no credit for Saint Joseph's Hospital sources existing in the 1977 baseline year						
<b>Bangor Mental Health Institute (BMHI)</b>						
EMMC conservatively assumed no credit for BMHI sources existing in the 1977 baseline year						

Emission parameters for EMMC and other nearby sources for MAAQS and increment modeling are listed in Table III-2. The emission parameters for EMMC are based on the maximum license allowed (worst-case) operating configuration, which accounts for the firing of #2 fuel oil in all units. For the purposes of determining PM<sub>10</sub> and NO<sub>2</sub> impacts, all PM and NO<sub>x</sub> emissions were conservatively assumed to convert to PM<sub>10</sub> and NO<sub>2</sub>, respectively.

TABLE III-2 : Stack Emission Parameters

Facility/Stack	Averaging Periods	SO <sub>2</sub> (g/s)	PM <sub>10</sub> (g/s)	NO <sub>2</sub> (g/s)	CO (g/s)	Stack Temp (K)	Stack Velocity (m/s)
<b>MAXIMUM LICENSE ALLOWED</b>							
<b>Eastern Maine Medical Center</b>							
Co-Generation Plant Stack	All	0.41	0.49	2.99	0.95	436.00	14.37
New Generator Stack	All	0.10	0.11	4.79	1.54	755.00	69.99
Existing Boiler Stack	All	6.78	0.32	3.37	0.94	450.00	17.02
Generator #2 Stack	All	0.09	0.09	5.89	1.57	811.00	69.16
Generator #3 Stack	All	0.09	0.09	5.89	1.57	811.00	69.16
<b>Acadia Hospital</b>							
Main Stack	All	0.35	0.02	0.18	0.05	450.00	8.66
<b>Saint Joseph's Hospital</b>							
Main Stack	All	2.93	0.48	2.00	0.13	450.00	3.98
<b>Bangor Mental Health Institute (BMHI)</b>							
Main Stack	All	0.51	0.23	1.93	0.13	450.00	2.58
<b>BASELINE – 1987</b>							
<b>Eastern Maine Medical Center</b>							
EMMC conservatively assumed no credit for EMMC sources existing in the 1987 baseline year							
<b>Acadia Hospital</b>							
EMMC conservatively assumed no credit for Acadia Hospital sources existing in the 1987 baseline year							
<b>Saint Joseph's Hospital</b>							
EMMC conservatively assumed no credit for Saint Joseph's Hospital sources existing in the 1987 baseline year							
<b>Bangor Mental Health Institute (BMHI)</b>							
EMMC conservatively assumed no credit for BMHI sources existing in the 1987 baseline year							
<b>BASELINE – 1977</b>							
<b>Eastern Maine Medical Center</b>							
Cleaver-Brooks Boiler Stack	All		0.25			450.00	7.34
Superior Boiler Stack	All		0.17			450.00	1.57
<b>Acadia Hospital</b>							
EMMC conservatively assumed no credit for Acadia Hospital sources existing in the 1977 baseline year							
<b>Saint Joseph's Hospital</b>							
EMMC conservatively assumed no credit for Saint Joseph's Hospital sources existing in the 1977 baseline year							
<b>Bangor Mental Health Institute (BMHI)</b>							
EMMC conservatively assumed no credit for BMHI sources existing in the 1977 baseline year							

**Key:** Shaded areas = not modeled

### C. Single Source Modeling Impacts

SCREEN3 modeling was initially performed for four EMMC operating scenarios that represented maximum, typical and minimum operations. ISC-PRIME refined modeling, using 5 years of off-site meteorological data, and CI-VM screening modeling was then performed for the worst-case operating scenario, as determined by the screening modeling.

The model results for EMMC alone, in both simple and complex terrain, are shown in Tables III-3 and III-4, respectively. Maximum predicted impacts that exceed their respective significance level are indicated in boldface type. Annual NO<sub>2</sub> impacts from the emergency generators, which were based on short-term emission rates, were modeled in separate runs and the impacts adjusted to account

Deleted: DRAFT .DRAFT

for their license limitation to operate 400 hours/year. The adjusted maximum predicted impacts from each emergency generator run were then conservatively added together to yield the total impact, regardless of receptor location.

No further modeling was required for pollutant/terrain combinations that did not exceed their respective significance levels.

TABLE III-3 : Maximum ISC-PRIME Simple Terrain Impacts from EMMC Alone

Pollutant	Averaging Period	Max Impact ( $\mu\text{g}/\text{m}^3$ )	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class II Significance Level ( $\mu\text{g}/\text{m}^3$ )
SO <sub>2</sub>	3-hour	<b>103.14</b>	521.900	4962.285	54.86	<b>25</b>
	24-hour	<b>43.41</b>	519.550	4962.750	39.62	<b>5</b>
	Annual	<b>4.75</b>	519.550	4962.650	39.62	<b>1</b>
PM <sub>10</sub>	24-hour	<b>30.69</b>	519.765	4961.865	26.21	<b>5</b>
	Annual	<b>3.70</b>	519.845	4961.905	22.86	<b>1</b>
NO <sub>2</sub>	Annual	<b>13.03*</b>	--	--	--	<b>1</b>
CO	1-hour	1758.82	519.965	4961.795	0.00	<b>2000</b>
	8-hour	<b>672.60</b>	519.765	4961.865	26.21	<b>500</b>

**Key:** \* = Predicted impact from emergency generators adjusted for 400 hours/year limitation

TABLE III-4 : Maximum CI-VM Complex Terrain Impacts from EMMC Alone

Pollutant	Averaging Period	Max Impact ( $\mu\text{g}/\text{m}^3$ )	Class II Significance Level ( $\mu\text{g}/\text{m}^3$ )
SO <sub>2</sub>	3-hour	<b>50.18</b>	<b>25</b>
	24-hour	<b>13.94</b>	<b>5</b>
	Annual	<b>4.46</b>	<b>1</b>
PM <sub>10</sub>	24-hour	2.26	<b>5</b>
	Annual	0.72	<b>1</b>
NO <sub>2</sub>	Annual	<b>4.88*</b>	<b>1</b>
CO	1-hour	99.32	<b>2000</b>
	8-hour	69.52	<b>500</b>

**Key:** \* = Predicted impact from emergency generators adjusted for 400 hours/year limitation

#### D. Combined Source Modeling Impacts

Since predicted modeled impacts from EMMC alone exceeded significance levels, as indicated in boldface type in Tables III-3 and III-4, other sources not explicitly included in the modeling analysis must be accounted for by using representative background concentrations for the area.

Background concentrations, listed in Table III-5, are derived from representative Eastern Maine urban background data.



TABLE III-5 : Background Concentrations

Pollutant	Averaging Period	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Date
SO <sub>2</sub>	3-hour	<b>63</b>	2002 <sup>1</sup>
	24-hour	<b>29</b>	
	Annual	<b>9</b>	
PM <sub>10</sub>	24-hour	<b>69</b>	2002 <sup>2</sup>
	Annual	<b>17</b>	
NO <sub>2</sub>	Annual	<b>25</b>	2002 <sup>3</sup>
CO	8-hour	<b>6,511</b>	1989 <sup>1</sup>

**Notes:**

<sup>1</sup> CKP site, Lewiston

<sup>2</sup> KPS site, Bangor

<sup>3</sup> EMPACT/PEOPL site, Portland

MEDEP-BAQ identified other sources whose impacts would potentially be significant in EMMC's significant impact area. Other sources explicitly included in the combined source modeling analysis were: Acadia Hospital, Saint Joseph's Hospital and BMHI.

Table III-6 summarizes maximum combined source SO<sub>2</sub>, PM<sub>10</sub>, NO<sub>2</sub> and CO impacts. The higher of the simple or complex terrain maximum predicted impacts are added to the conservative background concentrations to demonstrate compliance with MAAQS. All combined source impacts for all pollutant/averaging periods were below their respective MAAQS. Because the predicted impacts using this method meet MAAQS, no further MAAQS modeling for EMMC needed to be performed.

TABLE III-6 : Maximum Combined Sources Impacts

Pollutant	Averaging Period	Max Impact ( $\mu\text{g}/\text{m}^3$ )	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Back-Ground ( $\mu\text{g}/\text{m}^3$ )	Max Total Impact ( $\mu\text{g}/\text{m}^3$ )	MAAQS ( $\mu\text{g}/\text{m}^3$ )
SO <sub>2</sub>	3-hour	<b>141.96</b>	517.850	4962.350	51.82	<b>63</b>	<b>204.96</b>	<b>1150</b>
	24-hour	<b>67.82</b>	517.750	4962.350	51.82	<b>29</b>	<b>96.82</b>	<b>230</b>
	Annual	<b>8.51</b>	517.850	4962.750	48.77	<b>9</b>	<b>17.51</b>	<b>57</b>
PM <sub>10</sub>	24-hour	<b>30.69</b>	519.765	4961.865	26.21	<b>69</b>	<b>99.69</b>	<b>150</b>
	Annual	<b>3.82</b>	519.845	4961.905	22.86	<b>17</b>	<b>20.82</b>	<b>40</b>
NO <sub>2</sub>	Annual	<b>24.63</b>	--	--	--	<b>25</b>	<b>49.63</b>	<b>100</b>
CO	8-hour	<b>672.60</b>	519.765	4961.865	26.21	<b>6,511</b>	<b>7183.60</b>	<b>10,000</b>

E. Increment

EMMC's maximum increment impacts were predicted using the ISC-PRIME refined model in simple terrain and CI-VM screening model in complex terrain. For addressing increment impacts in intermediate terrain (i.e., terrain above stack top and below plume centerline), the ISC-PRIME and CI-VM models were run individually, and the higher of the two increment impacts chosen, per EPA Model Clearinghouse guidance Memo #77.

Deleted: DRAFT .DRAFT

With the exception of PM<sub>10</sub>, EMMC conservatively assumed that no credit was to be taken for any EMMC source or off-site sources existing in the 1987 and 1977 baseline years. In addition, all existing sources were conservatively modeled at their maximum licensed allowed emission rates, with no credit allowed for current-actual emissions based on recent fuel use data.

Results of the single and combined source Class II increment analyses are shown in Tables III-7 and III-8, respectively. All predicted increment impacts were below all increment standards. Because all predicted increment impacts meet increment standards, no further Class II SO<sub>2</sub>, PM<sub>10</sub> and NO<sub>2</sub> increment modeling for EMMC needed to be performed.

TABLE III-7 : Class II Increment Consumption – EMMC Alone

Pollutant	Averaging Period	Max Impact (µg/m <sup>3</sup> )	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class II Increment (µg/m <sup>3</sup> )
SO <sub>2</sub>	3-hour	103.14	521.900	4962.285	54.86	512
	24-hour	43.41	519.550	4962.750	39.62	91
	Annual	4.75	519.550	4962.650	39.62	20
PM <sub>10</sub>	24-hour	10.38	519.825	4961.875	24.38	30
	Annual	3.70	519.845	4961.905	22.86	17
NO <sub>2</sub>	Annual	13.03	--	--	--	25

TABLE III-8 : Class II Increment Consumption – Combined Source

Pollutant	Averaging Period	Max Impact (µg/m <sup>3</sup> )	Receptor UTM E (km)	Receptor UTM N (km)	Receptor Elevation (m)	Class II Increment (µg/m <sup>3</sup> )
SO <sub>2</sub>	3-hour	141.96	517.850	4962.350	51.82	512
	24-hour	67.82	517.750	4962.350	51.82	91
	Annual	8.51	517.850	4962.750	48.77	20
PM <sub>10</sub>	24-hour	11.93	520.350	4962.650	45.72	30
	Annual	3.82	519.845	4961.905	22.86	17
NO <sub>2</sub>	Annual	24.63	--	--	--	25

Federal guidance and Chapter 140 of the DEP regulations require that any major source undergoing a major modification provide additional analyses of impacts that would occur as a direct result of the general, commercial, residential, industrial and mobile-source growth associated with the construction and operation of that source. Since this licensing action represents a minor modification to an existing minor source, no additional analyses were required.

#### F. Class I Impacts

Since the current licensing action for EMMC represents a minor modification to a minor source and the nearest Class I area is approximately 52 kilometers away, MEDEP has determined that an assessment of Class I Air Quality Related Values (AQRVs) is not required.

Deleted: DRAFT ..DRAFT

G. Summary

In summary, it has been demonstrated that EMMC in its proposed configuration will not cause or contribute to a violation of any SO<sub>2</sub>, PM<sub>10</sub>, NO<sub>2</sub> or CO averaging period MAAQS or any SO<sub>2</sub>, PM<sub>10</sub> or NO<sub>2</sub> averaging period Class II increment standards.

**ORDER**

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-184-71-M-A subject to the conditions found in Air Emission License A-184-71-K-R/A and in the following conditions:

**The following shall replace Condition 18 of air emission license A-184-71-K-R/A:**

(18) Fuel oil sulfur requirements

- A. The maximum sulfur content of #2 fuel oil fired into Boilers #1, #2, #3, #4, #5 and #6 shall not exceed 0.5% by weight. Compliance is based on fuel receipts from the supplier indicating the fuel was #2 fuel oil. [MEDEP Chapter 115, BPT]

**The following shall replace Condition 20 of air emission license A-184-71-K-R/A:**

(20) Emergency Generators

- A. Emissions from Generator #1 shall not exceed the following [MEDEP Chapter 115, BPT]:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.12	0.59
PM <sub>10</sub>	n/a	0.59
SO <sub>2</sub>	n/a	0.25
NO <sub>x</sub>	n/a	15.62
CO	n/a	4.15
VOC	n/a	0.49

- B. Emissions from Emergency Generator #2 and #3 shall each not exceed the following [MEDEP Chapter 115, BPT]:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.12	0.71
PM <sub>10</sub>	n/a	0.71
SO <sub>2</sub>	n/a	0.75
NO <sub>x</sub>	n/a	53.80
CO	n/a	12.41
VOC	n/a	1.46

- C. Emissions from Emergency Generator #5 shall not exceed the following [MEDEP Chapter 115, BACT]:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.06	0.91
PM <sub>10</sub>	n/a	0.91
SO <sub>2</sub>	n/a	0.79
NO <sub>x</sub>	n/a	37.97
CO	n/a	12.22
VOC	n/a	1.67

- D. Generators #1, #2, #3, and #5 each shall be limited to 400 hours per year of operation, based on a 12 month rolling total. An hour meter shall be maintained and operated on Generators #1, #2, #3 and #5. [MEDEP Chapter 115, BPT/BACT]
- E. 12-month rolling total NO<sub>x</sub> emissions from Generators #1, #2, #3 and #5 (combined) shall not exceed 27.9 tons. Monthly NO<sub>x</sub> emissions shall be based on the following [MEDEP Chapter 115, BPT/BACT]:

$$\text{Generator \#1: } \frac{15.62 \# \text{ NO}_x}{\text{Hour}} \times \frac{\text{Hours Generator \#1 operated}}{\text{month}} \times \frac{\text{tons}}{2000 \#}$$

$$\text{Generator \#2\&\#3: } \frac{53.80 \# \text{ NO}_x}{\text{Hour}} \times \frac{\text{Hours Generator \#2 \& \#3 operated}}{\text{month}} \times \frac{\text{tons}}{2000 \#}$$

$$\text{Generator \#5: } \frac{37.97 \# \text{ NO}_x}{\text{Hour}} \times \frac{\text{Hours Generator \#5 operated}}{\text{month}} \times \frac{\text{tons}}{2000 \#}$$

- F. The sulfur content of the fuel used in the generators shall be less than or equal to 0.05% by weight, demonstrated by fuel receipts from the supplier. [MEDEP Chapter 115, BPT]

- G. A log documenting the dates, times and reasons for operation for each generator shall be kept. [MEDEP Chapter 115, BPT]
- H. Visible emissions from Generator #1, #2, and #3 shall not exceed 30% opacity on a six- (6) minute block average basis, except for two (2) six (6) minute block averages in a 3-hour period. [MEDEP Chapter 101]
- I. Visible emissions from Generator #5 shall not exceed 20% opacity on a six- (6) minute block average basis, except for two (2) six (6) minute block averages in a 3-hour period. [MEDEP Chapter 101]
- J. Generators #1, #2, #3, and #5 may be operated periodically for test purposes, planned utility maintenance power outages and during emergencies (as defined in Chapter 100 of the Department's regulations). Generators #1, #2, #3 and #5 may also be operated in the event that the combustion turbine generator is unable to provide electric power to the EMMC campus due to a planned or unplanned outage. EMMC shall not operate Generators #1, #2, #3, or #5 as Dispatchable Generators (i.e., they will not be available for dispatching by Bangor Hydro and ISO-New England), nor shall they operate as peak shaving units. [MEDEP Chapter 115, BPT/BACT]
- K. Generator #4 shall not be operated on site. [MEDEP Chapter 115, BPT]

**The following shall replace Condition 21 of air emission license A-184-71-K-R/A:**

- (21) Boiler Fuel use limits [MEDEP Chapter 115, BPT]

Combined #2 fuel oil and natural gas heat input into all of the boilers shall not exceed 210,000 MMBtu on a 12-month rolling total. The following shall be used to determine the monthly heat input into all of the boilers:

$$\left( \frac{\text{gal \#2 fuel oil}}{\text{month}} \right) \left( \frac{0.14 \text{ MMBtu}}{\text{gal \#2 fuel oil}} \right) + \left( \frac{\text{scf nat. gas}}{\text{month}} \right) \left( \frac{0.00102 \text{ MMBtu}}{\text{scf nat. gas}} \right) =$$
$$\frac{\text{MMBtu heat input to boilers}}{\text{month}}$$

**The following are new conditions:**

- (25) Combustion Turbine Generator (CTG)

A. EMMC shall comply with any applicable New Source Performance Standards contained in 40 CFR 60. As of the issuance date of this license, NSPS Subpart GG would apply to the CTG. However, EPA recently proposed new standards for new combustion turbines (Subpart KKKK), which for EMMC's proposed turbine may take precedence over Subpart GG depending on the language of the final rule, if adopted." [40 CFR Part 60, Subparts GG and KKKK]

- B. EMMC shall monitor the nitrogen content of the fuel in accordance with the requirements of 40 CFR Part 60, Subparts GG and KKKK, as applicable. [MEDEP Chapter 115, BACT, 40 CFR Part 60, Subparts GG and KKKK]
- C. The sulfur content of the #2 fuel oil used in the CTG shall not exceed 0.05% by weight, demonstrated by fuel receipts from the supplier. EMMC shall also monitor the sulfur content of the fuel in accordance with the requirements of 40 CFR Part 60, Subparts GG and KKKK, as applicable. [MEDEP Chapter 115, BACT, 40 CFR Part 60, Subparts GG and KKKK]
- D. EMMC shall not burn more than 941,871 gallons of oil in the CTG in a 12-month period without the installation and utilization of a selective catalytic reduction (SCR) unit as a NO<sub>x</sub> pollution control device. Compliance with the fuel oil limit shall be demonstrated using fuel oil purchasing records and oil storage tank inventory readings. [MEDEP Chapter 115, BACT]
- E. If EMMC burns more than 941,871 gallons of fuel oil in a 12-month period, EMMC shall retrofit the SCR technology within twelve (12) months of the turbine exceeding the above oil consumption level. [MEDEP Chapter 115, BACT]
- F. When firing fuel oil, emissions from the CTG shall not exceed the following [MEDEP Chapter 115, BACT]:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.061	3.90
PM <sub>10</sub>	n/a	3.90
SO <sub>2</sub>	n/a	3.30
NO <sub>x</sub>	n/a	23.70
CO	n/a	7.50
VOC	n/a	2.20

- G. When firing natural gas, emissions from the CTG shall not exceed the following [MEDEP Chapter 115, BACT]:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.042	2.70
PM <sub>10</sub>	n/a	2.70
SO <sub>2</sub>	n/a	0.18
NO <sub>x</sub>	n/a	6.10
CO	n/a	7.40
VOC	n/a	0.40

- H. When firing natural gas, NO<sub>x</sub> emissions from the CTG shall not exceed 25 ppmdv (15%O<sub>2</sub>). Compliance will be demonstrated by a stack test on the CTG (while the CTG is firing natural gas) within 60 days after achieving the maximum production rate at which the unit will be operated, but not later than 180 days after initial startup of the unit. Based upon the stack test results, the

Deleted: DRAFT ..DRAFT

25 ppmdv NO<sub>x</sub> limit may be lowered to 20 ppmdv (15%O<sub>2</sub>). [MEDEP Chapter 115, BACT, 40 CFR 60.8]

- I. When firing #2 fuel oil in the CTG, visible emissions shall not exceed 10 percent opacity on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. This opacity limit shall not apply during the first four hours following the initiation of cold startup or planned shutdown, provided that operating records are available to demonstrate that the facility was being operated to minimize emissions. [MEDEP Chapter 101, BACT]
- J. When firing natural gas in the CTG, visible emissions shall not exceed 10 percent opacity on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. This opacity limit shall not apply during the first four hours following the initiation of cold startup or planned shutdown, provided that operating records are available to demonstrate that the facility was being operated to minimize emissions. [MEDEP Chapter 101, BACT]

DONE AND DATED IN AUGUSTA, MAINE THIS                      DAY OF                      , 2005.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: \_\_\_\_\_  
DAWN R. GALLAGHER, COMMISSIONER

**The term of this amendment shall be concurrent with the term of Air Emission License A-184-71-K-R/A.**

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 27, 2004

Date of application acceptance: January 5, 2005

Date filed with the Board of Environmental Protection: \_\_\_\_\_

This order prepared by Mark E. Roberts, Bureau of Air Quality.

Deleted: DRAFT .DRAFT